Claims

1. Apparatus for scalable encoding of a spectrum of a signal including audio and/or video information, with the spectrum comprising binary spectral values, the apparatus comprising:

means (102) for generating a first sub-scaling layer using bits of a certain order of a first number of the binary spectral values in a band, with the first number being greater or equal to 1 and less than a total number of the binary spectral values in the band, and for generating a second sub-scaling layer using bits of the certain order of a second number of the binary spectral values, with the means (102) for generating being implemented so as to select the second number of the binary spectral values, such that the number is greater than or equal to 1 and less than the total number of the binary spectral values in the band, and to further determine the second number of the spectral values, such that the number comprises at least one binary spectral value which is not contained in the first number of binary spectral values; and

means (106) for forming an encoded signal, with the means for forming being implemented so as to include the first sub-scaling layer and the second sub-scaling layer into the encoded signal such, that the first and the second sub-scaling layer (113a, 113b) are separately decodable from each other.

2. Apparatus in accordance with claim 1, further comprising:

means for generating a full-scaling layer using all bits with an order, which is different from the certain order, in the band, and

with the means for forming (106) being further implemented, so as to include the full-scaling layer in the bit stream, such that it is independently decodeable from the first and the second sub-scaling layer (113a, 113b).

3. Apparatus in accordance with claim 1, wherein the binary spectral values are quantized, with the apparatus further comprising:

means (84) for calculating orders of most significant bits of a psycho-acoustic masking threshold for the bands; and

means (604) for defining scaling layers of the bits of the binary spectral values, with a scaling layer comprising bits of the binary spectral values, the orders of which are in a certain difference to the orders of the most significant bits of the psycho-acoustic masking threshold for the bands or the orders of which are equal to the orders of the most significant bits of the psycho-acoustic masking threshold for these bands.

4. Apparatus in accordance with claim 3,

wherein the means (102) for generating the first and the second sub-scaling layers (113a, 113b) being implemented so as to use as bits of a certain order the bits of the binary spectral values, the difference of which to the order of the most significant bits of the psycho-acoustic masking threshold in the band is equal to "+1", "0" and/or "-1".

5. Apparatus in accordance with claim 3,

wherein the means (84) for calculating the orders of the most significant bits of the psycho-acoustic masking threshold being implemented so as to determine for

each spectral value in the band an order of a most significant bit or to determine an order of a most significant bit of the psycho-acoustic masking threshold for the entire band.

6. Apparatus in accordance with claim 3, wherein the means (106) for forming is further implemented so as to include information on the psycho-acoustic masking threshold as side information (110) into the encoded signal.

7. Apparatus in accordance with claim 1,

wherein the first sub-scaling layer is decodeable prior to the second sub-scaling layer, and

wherein the means (102) for generating the first and second sub-scaling layer is implemented so as to select for the first number of the binary spectral values the spectral value(s), by which a maximum precision gain for the band may be achieved.

8. Apparatus in accordance with claim 1,

wherein the first sub-scaling layer is decodeable prior to the second sub-scaling layer, and

wherein the means (102) for generating the first and the second sub-scaling layers is implemented so as to use for the first sub-scaling layer the binary spectral value which, represented by the bits in higher scaling layers, comprises the greatest difference to a psycho-acoustic masking threshold for the spectral value in the band.

9. Apparatus in accordance with claim 1,

wherein the means (102) for generating the first and the second sub-scaling layers is implemented so as to use for the first sub-scaling layer the binary spectral value which, represented by the bits in higher scaling layers, is the smallest quantized spectral value in the band.

10. Apparatus in accordance with claim 1,

wherein the spectral values have been generated by an integer MDCT from time-sampled values of the signal.

11. Apparatus in accordance with claim 1, wherein the spectral values have been quantized using a psycho-acoustic and/or psycho-optical model (82).

12. Apparatus in accordance with claim 11,

wherein the means (102) for generating a first and a second sub-scaling layer is implemented so as to use a constant certain order of bits in the bands.

13. Apparatus in accordance with claim 11,

wherein the certain order includes the least significant order of the bits of the quantized binary spectral values.

14. Apparatus in accordance with claim 1,

wherein a band comprises m spectral values,

with m is being greater than or equal to 2, and

wherein the means (102) for generating the first and the second sub-scaling layer is implemented so as to calculate the first and second number of sub-scaling layers, such that they are at a maximum equal to m and

at a minimum equal to 1, wherein, in the case, in which m sub-scaling layers are present, each sub-scaling layer includes a bit of the certain order of exactly one spectral value, with one spectral value being present only in exactly one sub-scaling layer for the certain order.

15. Apparatus in accordance with claim 1, wherein m is equal to 4.

16. Apparatus in accordance with claim 1,

wherein the means (102) for generating the first and the second sub-scaling layer is implemented so as to carry out an arithmetical encoding of the first and/or second number of bits of the quantized spectral values of the certain order.

17. Apparatus for scalable decoding an encoded signal comprising a first and a second sub-scaling layer, with the first sub-scaling layer comprising bits of a certain order of a first number of binary spectral value in a band, with the second sub-scaling layer comprising bits of the certain order of a second number of binary spectral values in the band, and with the second number comprising at least one spectral value not contained in the first number, the apparatus comprising:

means (704) for extracting the first sub-scaling layer from the encoded signal and the second sub-scaling layer from the encoded signal; and

means for processing the first sub-scaling layer and the second sub-scaling layer so as to determine the bits of the certain order of the binary quantized spectral values in the band.

18. Apparatus in accordance with claim 17,

wherein the first number of the binary spectral values for the first sub-scaling layer is selected so as to achieve a maximum precision gain for a band,

wherein the means (704) for extracting is implemented so as to extract the first sub-scaling layer prior to the second sub-scaling layer.

19. Method for scalable encoding a spectrum of a signal including audio and/or video information, with the spectrum comprising binary spectral values, the method comprising the following steps:

generating (102) a first sub-scaling layer using bits of a certain order of the first number of binary spectral values in a band, with the first number being greater than or equal to 1 and less than a total number of the binary spectral values in the band, and for generating a second sub-scaling layer using bits of the certain order of a second number of binary spectral values, wherein the means (102) for generating is implemented so as to select a second number of the binary spectral values, such that the number is greater than or equal to 1 and less than the total number of the binary spectral values in the band, and to determine the second number of the spectral values further such, that the number comprises at least one binary spectral value, which is not contained in the first number of binary spectral values;

forming (106) an encoded signal, with the means for forming being implemented so as to include the first sub-scaling layer and the second sub-scaling layer into the encoded signal such, that the first and the second sub-scaling layers (113a, 113b) are separately decodeable from each other.

20. Method for scalable decoding an encoded signal comprising a first and a second sub-scaling layer, with the first sub-scaling layer comprising bits of a certain order of a first number of binary spectral values in a band, with the second sub-scaling layer comprising bits of the certain order of a second number of binary spectral values in the band, and wherein the second number comprising at least one spectral value not contained in the first number, the method comprising the following steps:

extracting (704) the first sub-scaling layer from the encoded signal and the second sub-scaling layer from the encoded signal; and

processing the first sub-scaling layer and the second sub-scaling layer so as to determine the bits of the certain order of the binary quantized spectral values in the band.

21. Computer program having a program code for carrying out the method in accordance with claim 19, when the program executes on a computer.

22. Computer program having a computer code for carrying out the method in accordance with claim 20, when the program executes on a computer.